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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/722,665 | 11/26/2003 | Curt Wortman | 174/307 | 7683 |

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| EXAMINER |
|---|
| GHULAMALI, QUTBUDDIN |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2611 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 01/12/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 10/722,665 | WORTMAN ET AL. |
| | Examiner | Art Unit | |
| | Qutub Ghulamali | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _26 November 2003_.

2a)☐ This action is **FINAL**.    2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1-21_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _21_ is/are allowed.

6)☒ Claim(s) _1-10,12 and 14-20_ is/are rejected.

7)☒ Claim(s) _11 and 13_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All  b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _3/22/04_.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

# DETAILED ACTION

## *Claim Objections*

1.      Claims 1, 7 and 11 are objected to because of the following informalities:  Claim

1, 7 and 11 recite the limitation "the versions" in lines 6, 12 and 16 respectively.

Shouldn't it recite "the plurality of phase-shifted versions"? to provide proper antecedent

basis.  Appropriate correction is required.

## *Claim Rejections - 35 USC § 112*

2.      The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

3.      Claims 5, 10 and 16 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

4.      Claims 5, 10 recite the limitation "n of the versions" in line 2.  There is insufficient

antecedent basis for this limitation in the claim because it is not understood what it

actually means.

5.      Claim 16 recites the limitation "apparatus as defined in claim 7" in line 2.  There

is insufficient antecedent basis for this limitation in the claim because there is no

recitation of any PLD in claim 7.

## *Claim Rejections - 35 USC § 102*

6.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the
United States before the invention thereof by the applicant for patent, or on an international application
by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this
title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act

of 1999 (AIPA) and the Intellectual Property and High Technology Technical

Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting

directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior

to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7.      Claims 1-10, 12, 14-16 rejected under 35 U.S.C. 102(e) as being anticipated by

Jenkins et al (USP 7,031,420).

Regarding claims 1, 14, Jenkins discloses system and method of detecting

phase of transitions in a data signal relative to a reference clock signal comprising:

producing a plurality of phase-shifted versions of the reference clock signal (producing

one or a plurality of phase shifted signals is well known in the art) (col. 2, lines 11-20;

fig. 5);

using each of the plurality of phase-shifted (skewed) versions in order of magnitude of

phase shift (skew) to sample the data signal (col. 2, lines 15-32; fig. 5; col. 9, lines 16-

21);

comparing the samples to a training pattern (initial start-up sequence or pattern) that is

initially aligned with training data in the data signal (col. 2, lines 43-47; col. 8, lines 29-

36);

re-aligning the training pattern with the training data each time use of one of the

versions causes the training pattern to become misaligned with the training data (col. 8,

lines 37-49); and

analyzing information including which of the versions caused misalignment to

approximate the phase of the transitions (fig. 5, earliest and latest sample points; col. 9,

lines 35-44).

As per claim 2, Jenkins discloses selecting one of the versions (even data or odd

data) for use in sampling the data signal after the training (initial start-up sequence or

pattern) data based at least in part on the phase of the transitions as approximated in

the analyzing (col. 2, lines 43-47; col. 5, lines 61-67; col. 6, lines 1-5; col. 8, lines 29-

36).

As to claim 3, Jenkins discloses each of the phase-shifted versions is delayed by

the same amount of delay relative to an immediately less phase-shifted one of the

versions (a programmable differential delay for creating same amounts of delay can be

designed to provide delay relative to an early or late skew in signal, is well known in the

art (col. 7, lines 54-62).

As per claims 4, 9, the delay is selected so that the unit interval is not an integer

multiple of the delay (can provide a half of a bit duration) (col. 8, lines 13-20).

As to claim 5, 10, delay line can be set to any multiple of delays as desired to compensate signal skew and is well known in the art of delay design.

As per claim 6, Jenkins discloses the data signal has a unit interval (0, 1, 2, 3 etc., fig, 5) corresponding to duration of each bit in the data signal, and wherein the selecting selects one of the versions that is near the center of the unit interval (col. 7, lines 43-48).

Regarding claim 7, Jenkins discloses an apparatus for detecting phase transitions in a data signal relative to a reference (core signal) clock signal comprising:

a plurality of delay circuit elements (fine tune delay line 200 and a coarse tune delay line 210, fig. 4) for producing a plurality of phase-shifted versions of the reference clock signal (fig. 5; col. 7, lines 54-62);

selection circuitry (sampler) for selectively selecting each of the versions in order of magnitude of phase shift as a sampling clock signal for sampling the data signal (col. 6, lines 41-55, 56-65);

comparison circuitry (phase comparator) for comparing samples of the data signal, taken using the sampling clock signal, to a training pattern (initial start-up sequence or pattern) (col. 2, lines 15-18, 43-47; col. 8, lines 29-36);

alignment circuitry for initially aligning the training pattern with training data in the data signal and for subsequently re-aligning the training pattern with the training data each time use of one of the versions causes the training pattern to become misaligned with the training data (col. 8, lines 37-56); and

circuitry for monitoring (deskew circuitry continuously monitors phase comparators 220)

which of the versions caused misalignment of the training pattern with the training data

(fig. 5, earliest and latest sample points; col. 9, lines 25-31, 35-44).

As per claim 8, Jenkins discloses delay lines are connected in series (fig. 4,

elements 200, 210) and have the same amount of delay (delay line can be designed to

have the same or similar amount of delay is well known in the art).

As to claim 12, Jenkins discloses selectively recirculating (feedback) the training

pattern in synchronism with the sampling clock signal (fig. 5; col. 7, lines 4-12).

Regarding claim 14, Jenkins discloses means for determining the approximate

phase of the data signal relative to the reference clock signal based at least in part on

which of the versions cause the misalignment (col. 7, lines 13-42).

Regarding claim 15, Jenkins discloses means for selecting one of the versions

for use in producing a retimed version of the data signal (fig. 5, elements data even,

data odd, LD_even and LD_odd).

Regarding claim 16, A programmable Logic Device (PLD) is well known in the art

to perform any of a wide range of logic tasks.


### Claim Rejections - 35 USC § 103

8.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

9.      Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Jenkins et al (USP 7,031,420) in view of Aung et al (US Pub. 2001/0033188).

        Regarding claim 17, Jenkins discloses all limitations of the claim including

processing circuitry (inherently implied) and a memory coupled to the processing

circuitry (fig. 11, elements 510, 530) above.  Jenkins does not disclose a programmable

Logic Device (PLD).  Programmable Logic Device (PLD) are well known in the art  and

as disclosed in Aung (abstract; page 2, section 0035).  It would have been obvious to a

person of skill in the art at the time of invention to utilize a PLD which is well known and

as taught by Aung in the circuit of Jenkins because it can be used among other tasks to

provide clock signal handling capability and facilitate clock and data recovery.

        As to claim 18, Jenkins discloses all limitations of the claim including processing

circuitry (inherently implied) and a memory coupled to the processing circuitry (fig. 11,

elements 510, 530) above.  Jenkins does not disclose a printed circuit board on which is

mounted a PLD.  Aung shows that various ways can be used including integrated

circuits or boards to accommodate PLD (page 3, section 0035).  It would have been

obvious to a person of skill in the art at the time of invention to utilize a printed circuit

board to mounted a PLD as taught by Aung in the circuit of Jenkins because it can not

only provide reduction in size but it can also enhance the propagation times (speed) of

various clock signals.

        As to claims 19 and 20, Jenkins, discloses al limitations of the claim above

including a memory.  Jenkins does not disclose memory mounted on a printed circuit

board and coupled to PLD.  The use of printed circuit board to mount memory including

processing circuitry or other components and coupling it to PLD, is well known in the art

and therefore, would have been obvious to a person skilled in the art to make use of

such components to derive the benefits of compact size quite readily.


## *Allowable Subject Matter*

10.    Claim 21 allowed.

11.    Claims 11 and 13 are objected to as being dependent upon a rejected base

claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.


## *Conclusion*

12.    The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

US Patents;

US Patent (6,304,623) to Richards et al.

US Patent (6,347,128) to Ransijn.

US Patent (6,363,129) to Agazzi.

US Patent (6,307,869) to Pawelski.

US Patent (6,288,656) to Desai.

US Patent (5,459,753) to Co et al.

US Patent (5,485,490) to Leung et al.

US Patent (5,533,072) to Georgiou et al.

US Patent (5,533,073) to Eriksson.

US Patent (5,535,252) to Kobayashi.

US Patent (5,673,295) to Read et al.

13.     Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-
3014.  The examiner can normally be reached on Monday-Friday, 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Mohammad Ghayour can be reached on (571) 272-3021.  The fax phone
number for the organization where this application or proceeding is assigned is 571-
273-8300.

Information regarding the status of an application may be obtained from the Patent.
Application Information Retrieval (PAIR) system.  Status information for published applications
may be obtained from either Private PAIR or Public PAIR.  Status information for unpublished
applications is available through Private PAIR only.  For more information about the PAIR
system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private
PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you
would like assistance from a USPTO Customer Service Representative or access to the
automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER

QG.
January 3, 2007.